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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO
09/737,206	12/14/2000	Henry F. Taylor		1329

7590 11/05/2002

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EXAMINER	
KIANNI, KAVEH C	
ART UNIT	**PAPER NUMBER**
2877	6

DATE MAILED: 11/05/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

PTO-90C (Rev. 10/03)

Office Action Summary	Application No. 09/737,206	Applicant(s) TAYLOR ET AL.
	Examiner Kevin C Kianni	Art Unit 2877

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on ______ .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 1-20 is/are pending in the application.

4a) Of the above claim(s) 10-20 is/are withdrawn from consideration.

5)☐ Claim(s) ______ is/are allowed.

6)☒ Claim(s) 1-8 is/are rejected.

7)☒ Claim(s) 9 is/are objected to.

8)☐ Claim(s) ______ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on 14 December 2000 is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on ______ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. ______ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

Notice of Draftsperson's Patent Drawing Review (PTO-948) — Notice of Informal Patent Application

3)☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) ______ — ☐ Other:

DETAILED ACTION

1. Applicant's election without traverse of claims 1-9 in paper No. 6 is acknowledged.

Allowable Subject Matter

2. Claim 9 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. Claim 9 is allowable because the prior art, in combination with other limitations of the base claim, does not teach wherein said first four port directional coupler and said second four port directional coupler each satisfy the condition that the sum of the fraction of optical power in TE polarization coupled into a particular input port which exits through a particular output port plus the fraction of optical power in TM polarization coupled into said particular input port which exits through said particular output port is substantially equal to unity.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claims 1-8 are rejected under 35 U.S.C. 103(a) as being unpatentable over combination of Schmid (US 5748810) and Tang et al. (Electronics Letters, 13th October 1994, Vol. 30, No. 21; page 1758-1759).

Regarding claims 1 and 3-4, Schmid teaches a guided wave optical tunable filter (shown in fig. 1; see col. 1, lines 5-6) for transmitting a selected frequency channel which is independent in a substantially broad range of optical frequencies in an incident light wave (see abstract and col. 8, lines 25) comprising:

a substrate 1 of a birefringent material which exhibits the linear (Pockels) electrooptic effect and the linear strain-optic effect (see col. 1, lines 27-36); an optical waveguide structure which supports a single mode for both TE and TM polarizations formed on said substrate (see col. 1, lines 27-36 and col. 2, lines 58-60), said optical waveguide structure consisting of a straight initial section (see fig. 1, item 71/81), a first symmetric branch 70/80/90a/100a, first and second polarization conversion/electrooptic tuning sections (fig. 4, items 20/21; col. 8, lines 10-34), a second symmetric branch 110/120/130/140 and a straight final section 2; wherein said initial section is positioned to receive said incident light wave (col. 5, lines 64-66) and said final section transmits said selected frequency channel (col. 6, lines 1-12); wherein said first and second polarization conversion/electrooptic tuning sections provide continuous optical paths between said first and second symmetric branches (see col. 5, line 64-col. 6, line 12); wherein optical path length experienced by a TE light wave in traversing said straight initial section, said first symmetric branch, said first polarization conversion/electrooptic

tuning section, said second symmetric branch, and said straight final section differs from the optical path length experienced by a TE light wave in traversing said straight initial section, said first symmetric branch said second polarization conversion/electroontic tuning section, said second symmetric branch, and said final section (see fig. 1, items 1-141; col. 1, line 64-col. 6, line 12) by half an optical wavelength (see col. 5, lines 58-col. 7, line 23; also col. 7, line 66-col. 8, line 9);

a multiplicity of strain-inducing strips of a film material situated on top of waveguide sections (see fig. 4, items 40-42; col. 10, lines 5-16) said strain-inducing strips having the effect of inducing polarization coupling in said polarization conversion/electrooptic tuning waveguide sections; said strain-inducing strips having a spatial periodicity A such that substantially complete phase-matched polarization conversion occurs in said first and second polarization conversion/electrooptic tuning waveguide sections at said selected optical frequency within said broad range of optical frequencies (col. 10, lines 5-28);

a source of applied voltage V (col. 10, line 12); electrodes disposed to produce an electric field in and around said first and second polarization conversion/electrooptic tuning waveguide sections in response to said applied voltage V (col. 10, lines 5-14); wherein said electric field causes a change in the birefringence in said first and second polarization conversion/electrooptic tuning, wave-guide sections such that said selected optical frequency is tuned in proportion to said applied voltage (col. 10, lines 5-16); and means connecting said source of applied voltage to said electrodes (see fig. 4-6, items electrodes; col. 10, lines 5-16).

However, Schmid does not specifically teach wherein dielectric material situated on top of said polarization conversion/electrooptic tuning, waveguide sections, strain-inducing strips situated on top of first polarization conversion/electrooptic, said strain-inducing strips being offset in position from said strain-inducing strip situated on top of second said polarization conversion/electrooptic tuning waveguide section by an odd integral multiple of A/2, wherein said positions are measured relative to said first symmetric branch, wherein said substrate material is lithium tantalite, wherein said strain inducing strips comprise a film of fused silica deposited uniformly on said substrate at a substrate temperature > 250C and subsequently patterned lithographically at or near room temperature. These limitations are taught by Tang et al. (see fig. 1, items substrate, electrodes and strips; page 1578, first column, last paragraph-page 1759, first column). Thus, Tang et al. provides improvement for phase match polarization conversion (page 1758, first column, 5th paragraph). Thus, it would have been obvious to person of ordinary skill in the art when the invention was made to modify Schmid's optical tunable filter's stripes 60,61,50,51 and add with that of Tang et al. (strain pads) in order to produce an optical filter that includes the above limitations, since the resultant optical filter system would balance optical paths (col. 1, lines 5-6) and would allow reconfiguration of optical network without altering the cabling of the components (col. 1, lines 42-45).

Regarding claim 2, as stated in rejection of claim 1, Schmid further teaches wherein said substrate material is lithium niobate (see col. 1, line 62).

Regarding claims 5 and 7-8, Scmid teaches a guided wave optical tunable filter (shown at least in fig. 3; see col. 1, lines 5-6) for adding one selected frequency channel to a substantially broad range of optical frequencies in an incident light wave, and for dropping said selected frequency channel from said substantially broad range of optical frequencies in an incident light wave (see col. 1, lines 37-54), comprising (a) a substrate 1 of a birefringent material which exhibits the linear (Pockels) electrooptic effect and the linear strain-optic effect (see col. 1, lines 27-36);

(b) an optical waveguide structure which supports a single mode for both TE and TM polarizations formed on said substrate (see col. 1, lines 27-36 and col. 2, lines 58-60); said optical waveguide structure consisting of a first straight initial throughput section (see fig. 1, item 2) and a second straight four port directional coupler (fig. 4, items 20-24), first and second polarization conversion/ electrooptic tuning sections (see fig. 1, items 20 and 21), and a second four port directional coupler (fig. 4, items 110/120/130/140 of which the two output ports 130/140 are joined in continuous fashion to a first straight final throughput section 2 and a second straight final drop section 3; wherein said first initial throughput section 2 is positioned to receive said incident light wave 71/81 and said first initial add section is positioned to receive input light in said selected frequency channel; wherein said first and second polarization conversion/ electrooptic tuning sections 20/21 provide continuous optical paths between said first and second four port directional couplers (col. 8, lines 10-34; col. 5, line 64-col. 6, line 12); wherein said first final throughput section transmits said incident light wave plus

light in said selected frequency channel coupled into said initial add section (fig. 4, item 2) minus light in said selected frequency channel coupled out of said final drop section (col. 1, lines 46-54 and col. 8, lines 10-34); wherein said second final drop section transmits light in said selected frequency channel coupled out of said final drop section (col. 8, lines 10-34); wherein optical path length experienced by a TE light wave in traversing said straight initial throughput section (col. 8, lines 14-25), said first four port directional coupler, said first polarization conversion/electrooptic tuning section, said second four port directional coupler, and said straight final drop section differs from the optical path length experienced by a TE light wave in traversing said straight initial throughput section, said first four port directional coupler, said second polarization conversion/electrooptic tuning section, said second four port directional coupler, and said straight final drop section (see fig. 1, items 1-141; col. 1, line 64-col. 6, line 12) by half an optical wavelength (see col. 5, lines 58-col. 7, line 23; also col. 7, line 66-col. 8, line 9);

a multiplicity of strain-inducing strips of a film material situated on top of waveguide sections (see fig. 4, items 40-42; col. 10, lines 5-16) said strain-inducing strips having the effect of inducing polarization coupling in said polarization conversion/electrooptic tuning waveguide sections; said strain-inducing strips having a spatial periodicity Λ such that substantially complete phase-matched polarization conversion occurs in said first and second polarization conversion/electrooptic tuning waveguide sections at said selected optical frequency within said broad range of optical frequencies (col. 10, lines 5-28);

a source of applied voltage V (col. 10, line 12); electrodes disposed to produce an electric field in and around said first and second polarization conversion/electrooptic tuning waveguide sections in response to said applied voltage V (col. 10, lines 5-14); wherein said electric field causes a change in the birefringence in said first and second polarization conversion/electrooptic tuning, wave-guide sections such that said selected optical frequency is tuned in proportion to said applied voltage (col. 10, lines 5-16); and means connecting said source of applied voltage to said electrodes (see fig. 4-6, items electrodes; col. 10, lines 5-16).

However, Schmid does not specifically teach wherein dielectric material situated on top of said polarization conversion/electrooptic tuning, waveguide sections, strain-inducing strips situated on top of first polarization conversion/electrooptic, said strain-inducing strips being offset in position from said strain-inducing strip situated on top of second said polarization conversion/electrooptic tuning waveguide section by an odd integral multiple of A/2, wherein said positions are measured relative to said first four-port directional coupler, wherein said substrate material is lithium tantalite, wherein said strain inducing strips comprise a film of fused silica deposited uniformly on said substrate at a substrate temperature > 250C and subsequently patterned lithographically at or near room temperature. These limitations are taught by Tang et al. (see fig. 1, items substrate, electrodes and strips; page 1578, first column, last paragraph-page 1759, first column). Thus, Tang et al. provides improvement for phase match polarization conversion (page 1758, first column, 5th paragraph). Thus, it would have been obvious to person of ordinary skill in the art when the invention was made to

modify Schmid's optical tunable filter's stripes 60,61,50,51 and add with that of Tang et al. (strain pads) in order to produce an optical filter that includes the above limitations, since the resultant optical filter system would balance optical paths (col. 1, lines 5-6) and would allow reconfiguration of optical network without altering the cabling of the components (col. 1, lines 42-45).

Regarding claim 6, as stated in rejection of claim 5, Schmid further teaches wherein said substrate material is lithium niobate (see col. 1, line 62).

Citation of Relevant Prior Art

5. Prior art made of record and not relied upon is considered pertinent to applicant's disclosure. In accordance with MPEP 707.05 the following references are pertinent in rejection of this application since they provide substantially the same information disclosure as this patent does. These references are:

Deaconet al. 5781670

Song 5400171

Risk 4793676

Land et al. 5225930

Pinnow et al. 4197008

Baran et a l. 5455877

These references are cited herein to show the relevance of the apparatus/methods taught within these references as prior art.

Contact Information

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kaveh Cyrus Kianni whose telephone number is (703) 308-1216.

The examiner can normally be reached on Monday through Friday from 8:30 a.m. to 6:00 p.m. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Frank Font, can be reached at (703) 308-4881.

Any response to this action should be mailed to:

Commissioner of Patents and Trademarks
Washington, D.C. 20231

or faxed to:

(703) 308-7722, (for formal communications intended for entry)

or:

(703) 308-7721, (for informal or draft communications, please label "PROPOSED" or "DRAFT")

Hand delivered responses should be brought to Crystal Plaza 4, 2021 South Clark Place, Arlington, VA., Fourth Floor (Receptionist).

Any inquiry of a general nature or relating to the status of this application should be directed to the Group Receptionist whose telephone number is (703) 308-0956.

Kevin Cyrus Kianni
Patent Examiner
Group Art Unit 2877

Frank Font
Supervisory Patent Examiner
Group Art Unit 2877

October 29, 2002